

Concentrically Mounted Wrapped Array with Cable Support, Phase I

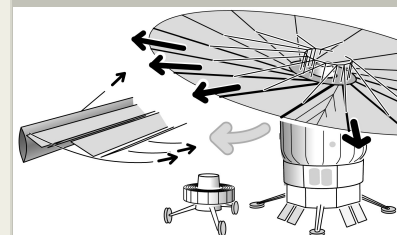
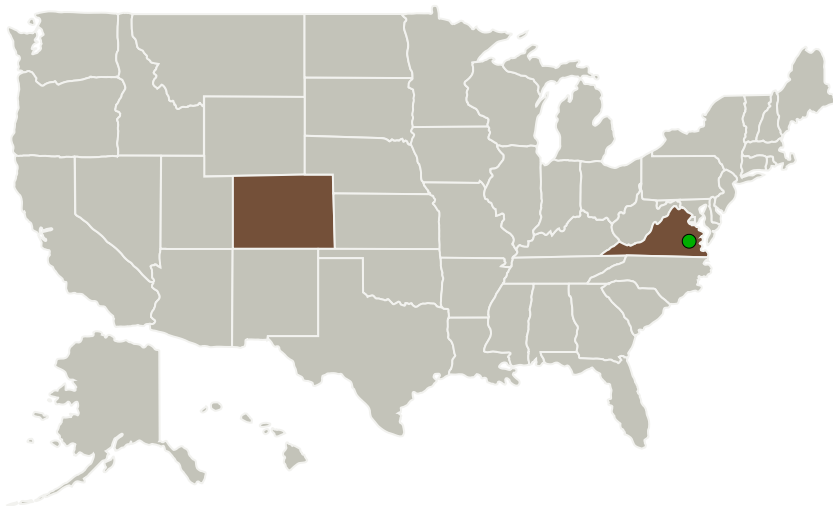


Completed Technology Project (2017 - 2017)

Project Introduction

Proposed is a lightweight PV array module architecture with up to or beyond 2500 m² surface area autonomously and robustly deployable in a gravitational field from stowage that is eminently streamlined for integration with space transport and surface mission systems. Supported via simple architectural features are highly prioritized Mars application objectives including modular or single large-unit use, self-cleaning and dust abutment, easy operation including tilt, transportability, robust tolerance for thermal and dimensional perturbations, and retractability. Integration with space transport systems is achieved via toroidal storage that can be designed to encircle any, large or small, core equipment such as a lander or habitat unit or a transportable power module, and seamlessly fits into launch vehicle payload envelopes. Similar to the recently developed wrapped array concept, rolled in the belt package are support ribs with the surface sectors folded between them; the PV cells are mounted on the latter. (The ribs concurrently emerge from the package straight and, diverging outward, unfold the sheet sectors.) When deployed, the PV strips, with gentle cross-slopes, are suspended from the ribs with a sagging/slack cable system that renders the design environmentally robust and permits self-cleaning via the wind effects themselves. Rib strength is boosted by cable support, analogous to mature crane jib support technology.

Primary U.S. Work Locations and Key Partners



Concentrically Mounted Wrapped Array with Cable Support, Phase I Briefing Chart Image

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Organizations Performing Work	Role	Type	Location
TentGuild Engineering Company	Lead Organization	Industry	Boulder, Colorado
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations

Colorado	Virginia
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Images



Briefing Chart Image

Concentrically Mounted Wrapped Array with Cable Support, Phase I
Briefing Chart Image
(<https://techport.nasa.gov/image/135594>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

TentGuild Engineering Company

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

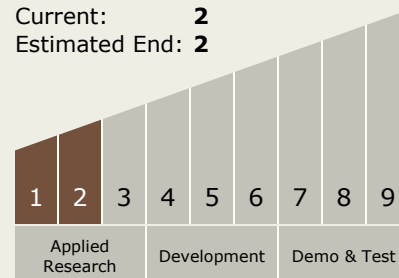
Carlos Torrez

Principal Investigator:

Gyula I Greschik

Technology Maturity (TRL)

Start: **1**
Current: **2**
Estimated End: **2**



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Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - └ TX12.5 Structural Dynamics
 - └ TX12.5.4 Test, Tools, and Methods

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System